TECHNICAL REVIEW AND EVALUATION
FOR
YUMA COGENERATION ASSOCIATES
AIR QUALITY PERMIT NO. 31433

I. COMPANY INFORMATION

Yuma Cogeneration Associates (YCA) owns and operates a 55 MW (nominal) combined cycle gas turbine cogeneration facility in Yuma, AZ. The facility is located at 280 North 27th Drive, Yuma. YCA is a major source for emissions of nitrogen oxide, carbon monoxide, and sulfur dioxide.

A. Company Information

Facility Name: Yuma Cogeneration Associates
Mailing Address: 280 North 27th Drive, Yuma, AZ 85364

B. Attainment Classification

This source is located in a non-attainment area for PM_{10}.

II. PROCESS DESCRIPTION

YCA's main operation consists of generating electricity for sale to San Diego Gas & Electric. YCA also provides low-pressure steam and intermediate-pressure steam to an industrial customer in the vicinity. The maximum process rates of the significant points of emissions at YCA are summarized in Table 1.

Table 1: Maximum Process Rates

Unit	Capacity
GE Frame 6 gas turbine	36.7 MW
Condensing steam turbine generator	18.3 MW
Duct burner	45 MMBtu/hr
Auxiliary boiler	20 MMBtu/hr
Cooling tower	141 MMBtu/hr
Fuel Oil storage tank	530,000 gallons

The General Electric Frame 6 turbine is fired by natural gas containing less than 0.8% sulfur by weight and operates all through the year. Arrangement for using No.2 fuel oil system is available in the unlikely event of a curtailment of the natural gas supply. To date, from the start of operations of power generation, there has been no requirement for using No.2 fuel.

A Heat Recovery Steam Generator (HRSG) uses waste heat from the gas turbine exhaust to generate -high, -intermediate, and -low pressure steam. High-pressure steam from HRSG is sent to the steam turbine generator, which generates additional electricity. Low-pressure steam from the HRSG is either condensed and returned to the HRSG or is sent to the nearby industrial customer for process heating. Intermediate-pressure steam from the HRSG is also sent to the industrial customer for process heating. A gas fired duct burner is operated as a supplement to the gas turbine exhaust when additional steam is required from the HRSG. One 20 million Btu/hour gas fired standby boiler is installed to generate Intermediate-pressure steam for the industrial customer in the event of shut down of the gas turbine.

The gas turbine and duct burner emissions along with the combustion products are exhausted into the atmosphere through an 85-foot high stack. A forced air draft cooling tower is used to complete the steam generator/condenser closed cycle by rejecting waste heat from the steam condenser to the atmosphere.

III. EMISSIONS

YCA has a potential to emit significant amounts of criteria pollutants like nitrogen oxides (NO_x), carbon monoxide (CO), and sulfur dioxide (SO_2).

There are two scenarios of operation. The gas turbine is designed to use natural gas or fuel oil as the fuel. Duct burners and the auxiliary boiler use only natural gas. Facility wide emissions from the YCA using natural gas or fuel oil as the fuel are summarized in Table 2 and Table 3 below.

Table 2: Facility wide Emissions with Gas Turbine using Natural Gas

Item	NO_x	CO	SO_2	VOC	PM
	Tons per year				
Turbine- NG	230.00	188.34	2.19	21.90	13.36
Duct Burner		16.34	0.12	1.07	1.48
Boiler	12.10	7.26	0.05	0.48	0.66
TOTAL	242.10	211.94	2.36	23.45	15.50

Table 3: Facility wide Emissions with Gas Turbine using Fuel Oil

Item	NO_x	CO	SO_2	VOC	PM
	Tons per year				
Turbine- NG	230.00	48.18	109.50	21.90	74.46
Duct Burner		16.34	0.12	1.07	1.48
Boiler	12.10	7.26	0.05	0.48	0.66
TOTAL	242.10	71.78	109.67	23.45	76.59

It should be noted that the facility was permitted as a PSD minor source in 1991 because they accepted limitations to stay below 250 tpy for NO_X and their PTE for other criteria pollutants was below 250 tpy. At that time, there was extensive national debate and uncertainty about the PSD threshold for cogeneration plants. ADEQ made the determination that YCA was a non categorical source with a PSD threshold of 250 tpy. Several other states made similar determinations during that time.

At this time, based on EPA guidance and recent ADEQ permitting actions, the Department has determined that cogeneration plants (like YCA) with an input heat capacity greater than 250 million Btu/hour are fossil-fuel fired steam electric plants and should be identified as categorical sources with a 100 tpy threshold for PSD purposes. In light of this, YCA will be considered as a PSD major source for NO_X, CO, and SO_2. Any future modification to the facility which will cause a net emissions increase above significant levels for these pollutants will trigger PSD review.

IV. COMPLIANCE HISTORY

Inspections are being regularly conducted at the YCA to ensure compliance with its applicable permit conditions. The YCA is currently in compliance with the permit conditions cited in Permit #1000103. The YCA has not been issued any Notice of Violation (NOV) to date. The Compliance Test Report for the tests conducted in the years 2000 to 2003 are enclosed.

V. APPLICABLE REGULATIONS

The Permittee has identified the applicable regulations that apply to each unit in its permit application. Table 4 summarizes the findings of the Department with respect to applicability or non-applicability of applicable regulations that apply to each unit. Previous permit conditions are discussed under Section VI of this technical review document.

Table 4: Applicable Regulations

Unit ID	Start-up date	Control Equipment	Applicable Regulations	Verification
GE Frame 6 gas turbine 37.3 MW	3/10/94	Steam Injection System	NSPS Subpart GG 40 CFR 60.332(a)(1) 40 CFR 60.332(b) 40 CFR 60.333(b) 40 CFR 60.334(a) 40 CFR 60.334(b)(2) 40 CFR 60.334(c)(2) 40 CFR 60.334(c)(4) 40 CFR 60.335(a)	The unit commenced construction after October 3, 1977 and is greater than 10.7 GJ/hr capacity.

Unit ID	Start-up date	Control Equipment	Applicable Regulations	Verification
			40 CFR 60.335(c)(1) 40 CFR 60.335(c)(2) 40 CFR 60.335(d) 40 CFR 60.335(e) 40 CFR 60.335(f)(1)	
Duct Burner 45 MMBtu/hr	1994	None	NSPS Subpart Dc 40 CFR 60.48c(a) 40 CFR 60.48c(g) 40 CFR 60.48c(i) Arizona SIP R9-3-503.C.1.a.i Arizona SIP R9-3-503.C.4.a	The unit commenced construction after June 9, 1989 and is less than 100 MMBtu/hr heat capacity but greater than 10 MMBtu/hr. Because the unit is fired by natural gas, only monitoring and recordkeeping requirements apply. Arizona SIP R9-3-503 (Standards of Performance for Fossil Fuel Fired Steam Generators and other Fuel Burning Equipment)applies to existing sources and other units which are less than 73 megawatts.
Cooling Tower		None	A.A.C. R18-2-702.B.1 R18-2-730.A.1 R18-2-730.D R18-2-730.G	These regulations are applicable to all unspecified sources.
Auxiliary boiler 20 MMBtu/hr	1993	None	NSPS Subpart Dc 40 CFR 60.48c(a) 40 CFR 60.48c(g) 40 CFR 60.48c(i) Arizona SIP R9-3-503.C.1.a.i Arizona SIP R9-3-503.C.4.a	The unit commenced construction after June 9, 1989 and is less than 100 MMBtu/hr heat capacity but greater than 10 MMBtu/hr. Because the unit is fired by natural gas, only monitoring and recordkeeping requirements apply. Arizona SIP R9-3-503 (Standards of Performance for Fossil Fuel Fired Steam Generators and other Fuel Burning Equipment)applies to existing sources and other units which are less than 73 megawatts.
Fuel Oil Storage Tank 530,000 gallons	1993	None	None	The fuel oil storage tank is subject to Subpart Kb because its capacity is greater than 40 cubic meters and it was constructed after July 23, 1984. However, 40 CFR 60.110b(c) exempts

Unit ID	Start-up date	Control Equipment	Applicable Regulations	Verification
				the tank from Subpart A and Kb because the maximum true vapor pressure is less than 3.5 kPa (0.11 kPa as shown in Section III.G). A.A.C. R18-2-710 is also not applicable because fuel oil #2 is not a petroleum liquid as defined in A.A.C. R18-2-701.21.
Mobile Sources	Not Applicable	Control Measures	A.A.C. R18-2-801 R18-2-802.A R18-2-804	These regulations are applicable to all mobile sources
Non-Point Sources	Not Applicable	Control Measures	A.A.C. R18-2-602 R18-2-604.A R18-2-604.B R18-2-605 R18-2-606 R18-2-607 R18-2-612	The regulations listed are applicable to non point sources
Abrasive Blasting	Not Applicable	Wet blasting, Enclosures or equivalent approved by Director	A.A.C. R18-2-702.B R18-2-726	Relevant requirements applicable to abrasive blasting

VI. PREVIOUS PERMIT CONDITIONS

This operating permit was issued to YCA on May 25, 1999 for the operation of a 55 MW (nominal) combined cycle gas turbine Cogeneration facility in Yuma. There were no revisions to the operating permit.

Condition No.	Determination				Comments
	Revise	Keep	Delete	Stream-line	
Att. A.	x				General Provisions - Revised to represent most recent permitting language
Att. B. I. A	x				Monitoring and recordkeeping requirements for the emission of NO_x from the gas turbine have been revised to reflect most recent permitting language
Att. B. I. B	x				Monitoring and recordkeeping requirements for the emission of SO_2 from the gas turbine have been revised to reflect most recent permitting language
Att. B. I. C.1		x			Fuel limitation for gas turbine and duct burner.
Att. B. I. C.2	x				Monitoring and recordkeeping requirements for the fuel used in gas turbine have been revised.
Att. B. II		x			Requirements for auxiliary boiler
Att. B. III.A	x				Requirements for non point sources have been revised to reflect most recent permitting language.
Att. B. III.B	x				Requirements for open burning have been revised to reflect most recent permitting language.
Att. B. IV	x				Voluntarily accepted emissions limitations have been placed under standards for emissions of NO_x.

VII. EMISSION LIMITS AND PERIODIC MONITORING

A. GE Frame 6 Turbine

NO_x: The unit is subject to the NO_x standard of 40 CFR 60.332(a)(1). The emission limit calculated by the equation is 98 ppm. However, the unit will be limited to the guaranteed performance emission rate provided by the manufacturer. This limit is 25 parts per million, at 15% oxygen.

Monitoring requirements include reporting on a quarterly basis the amount of NO_x emissions in tons per year (on a twelve month rolling total basis) and the amount of fuel fired. This condition will ensure that NO_x emissions are below 230 tpy.

SO_2: Subpart GG of 40 CFR stipulates combustion of fuels containing sulfur below 0.8% by weight in the gas turbine. The facility has further accepted the option of burning fuel oil containing less than 0.05% sulfur.

Monitoring for the sulfur content requirement includes maintaining the contractual agreement with the vendor limiting the sulfur content of the fuel. In addition, the Permittee must notify the Director within 30 days of any changes to the contractual agreement.

B. Duct Burner & Auxiliary Boiler

The NSPS standards of 40 CFR 60 Subpart Dc apply to this duct burner, because the heat rate of 45 MMBtu/hr is greater than 10 MMBtu/hr but less than 100 MMBtu/hr, and the burner was installed after June 9, 1989. Since the duct burner burns only natural gas, the only applicable requirement from 40 CFR 60 Subpart Dc is 40 CFR 60.48.c(g) which requires them to keep records of the amounts of the natural gas combusted.

The duct burner and the auxiliary boiler are also subject to PM and NO_X limits from Arizona SIP R9-3-503 because they are steam generating units less than 73 megawatt capacity.

VIII. TESTING

This operating permit does not contain emission limitations for carbon monoxide (CO). Performance testing for CO will be required if CO emission exceeds 100 tons per year, in accordance with Arizona Testing Manual. The performance testing will be conducted within 180 days after the rolling twelve month total, determined on a daily basis has emissions exceeding 100 tons per year.

The number of hours after which 100 tons per year of CO is emitted can be calculated as follows:

CO: (100 tpy * 8760 hrs/yr) / 188.34 tpy = 4650 hrs/yr

No testing is being required to show compliance with the PM and NO_X limits (specified in Arizona SIP R9-3-503) for the duct burner and the auxiliary boiler because the potential emissions are

significantly lower than the allowables.

Emission Unit	PM Limit	PM PTE	NO_X Limit	NO_X PTE
Duct Burner	19.05 lb/hr	0.34 lb/hr	9 lb/hr	6.22 lb/hr
Auxiliary Boiler	10.21 lb/hr	0.15 lb/hr	4 lb/hr	2.76 lb/hr

IX. CONTINUOUS EMISSIONS MONITORS (CEMS)

The NO_x CEMS at YCA are considered "compliance CEMs" in accordance with the installation permit. Therefore, excess emissions indicated by the CEM system shall be considered violations of the applicable emission limit.

X. COMPLIANCE ASSURANCE MONITORING

CAM applies only to emission units with pre-control potential to emit above 100 ton per year that are equipped with controls and have an emission limit. This facility has three pollutants namely, NO_x, CO, and SO_2 that have potential to emit above 100 ton per year. There are no controls installed for controlling CO and SO_2. Therefore CAM does not apply. The facility has a steam injection system for control of NO_x emissions from the turbine. However, since the Title V permit requires a NO_x CEMS for compliance demonstration, the facility is exempt from CAM requirements in accordance with the exemption specified in 40 CFR 64.2(b)(vi).

XI. INSIGNIFICANT ACTIVITIES

The following activities were proposed to be insignificant in the permit application.

S. No.	Activity	Determination	Comment
1	Piping of natural gas	Yes	No applicable requirement
2	Water treatment and cooling systems for process water	Yes	No applicable requirement
3	Storage of sodium hydroxide (50%)	Yes	No applicable requirement
4	Storage of sulfuric acid (93%)	Yes	No applicable requirement
5	Storage of sodium hypochlorite	Yes	No applicable requirement
6	Storage of Nalco 8103 coagulant (Polyquaternary Amine)	Yes	No applicable requirement

S. No.	Activity	Determination	Comment
7	Storage of Nalco 356 Corrosion Inhibitor (Cychlohexylamine & Morpholine)	Yes	No applicable requirement
8	Storage of Nalco 7208 feed water treatment (NaOH & TSP)	Yes	No applicable requirement
9	Nalco 7330 microbiocide -5-chloro-2-methyl-4-isothiazolin-3-one -2-methyl-4-isothiazolin-3-one	Yes	No applicable requirement
10	Eliminox oxygen scavenger (modified amino compounds)	Yes	No applicable requirement
11	Nalco 7384 Corrosion inhibitor (Polymer, zinc chloride)	Yes	No applicable requirement
12	Nalco 23289 Dispersant/Scale inhibitor (sulfonated polyacrylate and tracer)	Yes	No applicable requirement
13	General office activities and maintenance	Yes	No applicable requirement
14	Restroom facilities and associated cleanup operations	Yes	A.A.C. R18-2-101.54a
15	Air conditioning in office	Yes	No applicable requirement
16	Maintenance and repair of emission units and equipment	Yes	No applicable requirement
17	Circuit breakers	Yes	No applicable requirement
18	IC engine driven fire water pumps for emergency service	Yes	A.A.C. R18-2-101.54h
19	Nalco N-1801 (corrosion inhibitor)	Yes	No applicable requirement
20	Nalco 39-M (corrosion inhibitor)	Yes	No applicable requirement